

ARMY CAREER PROGRAM 12 (CP-12)

EXPLOSIVE SAFETY ASSESSMENT

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INTRODUCTION

In September 2009, the United States Army Technical Center for Explosives Safety (USATCES), in coordination with the Director of Army Safety, tasked LMI to assess the explosives safety competency level of U.S. Army Career Program 12 (CP-12), Safety and Occupational Health (SOH) professionals. USATCES is an element of the United States Army Defense Ammunition Center (DAC) and is responsible for implementing sound and vigilant explosives safety principles throughout the U.S. Army. USATCES continuously assesses training requirements to ensure explosives safety expertise is provided to support the Army mission as it relates to explosives safety. This paper summarizes our assessment approach and overall findings from our investigation. A full report of the assessment results and recommendations is currently under review by stakeholder groups with an expected completion date of 31 July 2010.

BACKGROUND

Due to the inherent risks associated with explosives, it is imperative that the Army provide a robust and effective explosives safety program to prevent accidents, incidents, and other events that could harm both the public and DoD personnel, and cause damage to property and the environment. While the U.S. Army has an excellent explosives safety record, it is always seeking ways to further enhance its explosives safety program.

Safety is the responsibility of every Army leader, soldier, civilian, and contractor; however, there are four types of Army personnel that have a direct responsibility for supporting the Army's explosives safety program. These include:

- ◆ Civilian CP-12 safety careerists,
- ◆ Civilian Quality Assurance Specialists (Ammunition Surveillance) (QASAS),
- ◆ Ammunition Warrant Officers (AWOs), and
- ◆ Civilian Ammunition Logistics Assistance Representatives (LARs).

CP-12 safety careerists are responsible for developing safety programs and ensuring compliance with federal, DoD, and Army safety policies at the installations and activities where they are assigned. Explosives safety is just one of many safety areas where CP-12 safety careerists must be proficient. Commanders in both deployed and non-deployed environments rely on CP-12 safety careerists to identify and reduce a broad range of workplace hazards.

QASAS are responsible for developing, managing, and executing munitions surveillance programs at the installation or activity where they are assigned. Ammu-

munition surveillance requires QASAS to inspect and determine the reliability of the Army's munitions stockpile. QASAS are also responsible for functions that affect explosives safety during handling, storage, transportation, maintenance, use, and disposal of ammunition and explosives.¹ QASAS have more of an "operational or technical" role in explosives safety than CP-12 safety careerists.

AWOs perform a similar role as QASAS. The primary difference is that QASAS are civilians, whereas AWOs are military personnel.

Ammunition LARs are QASAS who focus mainly on logistical issues.

WHY WAS THE ASSESSMENT PERFORMED?

The Army safety community provided feedback to USATCES that CP-12 safety careerists may not always be fully proficient to perform their full range of explosives safety missions. This could have adverse impact on safety to personnel, property, and the environment. Additionally, the roles and responsibilities of the CP-12 safety careerists are not always clearly understood or executed consistently throughout the Army-enterprise. For example, safety careerists sometimes seek QASAS that are assigned to their installation or activity to assist in fulfilling some of their explosives safety responsibilities. This arrangement can cloud roles and responsibilities for safety careerists and QASAS, along with commanders and tenants of installations or activities when they require assistance.

Some commanders believe that they may not be getting the full range of support for their explosives safety missions from their safety careerists because they may lack sufficient training and experience in explosive safety. This limited training and experience in explosives safety can become even more of an issue if the CP-12 safety careerists deploy and are expected to be competent in explosives safety.

USATCES initiated this assessment to determine if the current explosives safety training program is sufficiently preparing safety careerists to perform their explosives safety roles and responsibilities.

APPROACH

Army Explosives Safety Technical Competency Working Group

The Army explosives safety community is comprised of stakeholders from a number of Army commands (ACOMs) and organizations. These stakeholders formed the Army Explosives Safety Technical Competency Working Group in September 2009 to define the assessment objectives and strategy for completion. The working group continued to meet throughout the assessment to refine the strategy and objectives and to review LMI's preliminary findings. At the completion of the assessment, the work-

¹ Army Regulation (AR) 702-12, *Quality Assurance Specialist (Ammunition Surveillance)*.

ing group reviewed LMI's findings and assisted in developing recommendations and priorities for enhancing the Army's explosives safety program and improving the explosives safety competency level of CP-12 safety careerists.

The working group is comprised of explosives safety experts from the following organizations:

- ◆ Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health (DASA ESOH)
- ◆ Director of Army Safety
- ◆ Headquarters Department of Army (G4–Logistics)
- ◆ U.S. Army National Guard Bureau (NGB)
- ◆ Army Material Command (AMC)
- ◆ U.S. Army Installation Management Command (IMCOM)
- ◆ U.S. Army Forces Command (FORSCOM)
- ◆ U.S. Army Training and Doctrine Command (TRADOC)
- ◆ U.S. Army Joint Munitions Command (JMC)
- ◆ U.S. Army Combat Readiness/Safety Center (USACR/Safety Center)
- ◆ DAC USATCES.

Army Safety and Occupational Health Management Career Program Overview

The Army explosives safety program is staffed by civilian safety generalists with broad safety management responsibilities. Though there is some specialization under the program structure, there is currently no centralized specialization or certification in explosives safety. There are some locally created and managed certification programs in explosives safety that operate outside the safety careerist structure.

PROGRAM PRINCIPLES

The Army Safety Program,² under the Director of Army Safety (DASAF) and the U.S. Army Safety Center (USASC), assigns Occupational Safety and Health professionals with the responsibility for organizing and administering explosives safety programs. These designates are direct members of the installation/

² AR 385–10, 2-1.

activity commander's special staff and report directly to the commander. They are tasked with organizing and administering a comprehensive safety program and are responsible for planning, directing, and evaluating all safety and occupational health efforts within the command, including:

- ◆ Accident reporting
- ◆ Workplace safety
- ◆ Transportation safety
- ◆ Family and off-the-job safety
- ◆ Range safety
- ◆ Explosive safety
- ◆ Aviation safety
- ◆ Tactical safety
- ◆ Radiation safety.

DASAF is responsible for monitoring Army safety program effectiveness, supporting ACOMs, Direct Reporting Units (DRUs), and installation commanders with development of safety programs and administering specialized safety training courses for the Army.³ This is accomplished through the Army SOH Management CP-12. Currently, there is no military occupational specialty for safety in the Army, so the Army hires SOH Specialists, Safety Engineers, Industrial Hygienists, Health Physicists, and Air Safety Investigators to fulfill this role.

COMPETENCY ASSURANCE

To ensure systematic training and professional development of civilian career professionals, each Army career program is required to develop Army Civilian Training, Education, and Development System (ACTEDS) plans.⁴ ACTEDS plans outline sequential and progressive training for safety careerists from intern to senior managerial levels. The CP-12 ACTEDS Training Program provides training in various CP-12 career fields and identifies training that is critical to the successful performance of the CP-12 force protection mission. Careerists are required to have skill in over 80 competencies, including core requirements for managerial, physical, and mathematical sciences; hazard, control, and safety assessment methods; and specialized operational areas such as construction, industrial, transportation, tactical, explosives, range, fire, electrical, radiation, and aviation.

³ AR 385-10, 1-4.

⁴ AR 690-950.

There is currently no centralized structure for certification within the CP-12 program; however, the Director of Army Safety, under the Office of the Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health) is working to professionalize the CP-12 program and develop a structure for certification.⁵ Certification is also achievable and sanctioned for a limited number of CP-12 career tracks through external organizations. These tracks include:

- ◆ Occupational Health and Safety technologists
- ◆ Industrial Hygienist
- ◆ Health Physicists
- ◆ Safety Professionals.

CAREER FIELD PROGRAMS AND TRAINING PLAN

The CP-12 Career Planning Board (CPPB) is the executive agent for matters related to the professional development of safety careerists and has primary responsibility for determining training requirements and evaluating the quality of training delivered to careerists. The U.S. Army Combat Readiness Safety Center (USACR/ Safety Center) is the primary training source for safety careerists and is responsible for development and delivery of ACTEDS training courses.

The CP-12 Intern Training Program provides careerists with initial training in the functional elements of their career field. It is a two year education program including formal classroom instruction and on-the-job (OJT) training. Initial training encompasses fifteen weeks of formal instruction at the USACR/Safety Center. This training provides safety interns with the core competencies necessary for building foundational knowledge and skills in safety operations. Over the fifteen week period, three days are devoted to coverage of explosives safety. The course, *Explosive Safety Management*, covers a broad spectrum of topics and tools necessary to support explosives safety program management including:

- ◆ Regulatory requirements and responsibilities
- ◆ Training
- ◆ Surveys and inspections
- ◆ Accident reporting
- ◆ Site plans, licensing waivers, exemptions
- ◆ Lessons learned
- ◆ Explosives safety tools and resources.

⁵ *CP-12 Strategic Plan*, 11 September 2009.

Careerists are also required to take two explosives safety technical courses on-line (AMMO-45 and AMMO-63) and are eligible to take additional advanced courses in explosives safety as part of their Individual Development Plan (IDP). These courses are offered through the DAC schoolhouse (see Table 1 below).

Table 1. Explosives Safety Courses for Safety Careerists

Technical training on ammunition and explosives (A&E) safety	Level	Mandatory	Duration
<i>Explosives Safety Management</i>	Core	Yes	3 days
<i>AMMO-45—Fundamental Technical Aspects of Ammunition and Explosives</i>	Advanced	Yes	Self-paced
<i>AMMO-63—Ammunition and Explosives Safety</i>	Advanced	Yes	Self-paced
<i>AMMO-77—Characteristics of Propellant and Explosives</i>	Advanced	No	Self-paced
<i>AMMO 81—Hazard Classification</i>	Advanced	No	Self-paced
<i>AMMO 82—Introduction to Quantity Distance</i>	Advanced	No	10 days
<i>AMMO 81—Operational Safety</i>	Advanced	No	Self-paced

SUMMARY

Safety careerists do not follow a single structure or path to professional development. Professional development is accomplished through several paths centrally funded under the CP-12 program and includes training, formal education, job experience, and accreditation. Careerists develop an individual plan for professional development in collaboration with their supervisor under the ACTEDS training structure. The ACTEDS approach ensures all careerists acquire the same foundation of safety and occupational health functional training. The goal of core training is to develop safety professionals with a broad knowledge of safety components to support specialization along many different career paths/ assignments. Leadership of the CP-12 program is focused on professionalizing the career field and building a structure for certification, specialization, and accreditation. Currently, the career field does not offer a formal structure for specialization or certification in explosives safety and there is no centralized program for mapping or monitoring competency in explosives safety functional areas.

Assessment Tasks

LMI performed the following tasks in support of the assessment:

- ◆ Doctrine and policy review
- ◆ Analysis of other service programs and training
- ◆ Web-based surveys of explosive safety professionals
- ◆ Interviews with select FORSCOM and AMC Commanders

- ◆ Gap analysis by crosswalking gaps to DOTMLPF and policy
- ◆ Formulating findings and recommendations.

POLICY AND DOCTRINE REVIEW

LMI performed a comprehensive review of Army explosives safety policies and doctrine in order to identify gaps, shortfalls, and overlaps in explosives safety guidance, roles and responsibilities, training, and other areas that could adversely impact the competency of safety careerists across the Army enterprise.

The success of any Army program is based on a sound foundation of clear, concise policy and effective doctrine. Policy drives the doctrine and doctrine drives operational success. According to DoD Directive 6055.E, it is DoD policy to provide the maximum possible protection to people and property from the potential damaging effects of DoD military munitions (explosive and chemical) and to minimize exposures consistent with safe and efficient operations.

Policy

For the purpose of this report, policy is defined as regulatory and authoritative direction issued at the Department of Army (DA) level. Policy is normally found in ARs and Army Directives. Department of Army Pamphlets (DA PAMs) are also considered policy. Joint Publication 1-02, *DoD Dictionary of Military and Associated Terms*, does not have a definition of policy.

Policy defines responsibility by organization and defines and implements Army-wide programs. The Army Safety Program is one such program that is implemented in AR 385-10, *The Army Safety Program*, dated 23 August 2007.

AR 385-10 prescribes DA policy, responsibilities, and procedures to safeguard and preserve Army resources worldwide, to include soldiers, Army civilians, and Army property against accidental loss. It establishes composite risk management (CRM) as the Army's principal risk reduction methodology and assures regulatory and statutory compliance.⁶ Chapter 5 of AR 385-10 establishes explosives safety policy.

The Army incorporates safety in every aspect of policy and policy execution. Safety is the responsibility of every Army leader, civilian, contractor, and soldier. The same is true of explosives safety. Explosives safety is addressed in other Army policy publications that deal with explosives, but AR 385-10 is the primary explosives safety policy document.

Doctrine

Doctrine is defined in Joint Publication 1-02, *DoD Dictionary of Military and Associated Terms*, as: "Fundamental principles by which the military forces or

⁶ AR 385-10, Chapter 1, para 1-1, page 1, dated 23 August 2007.

elements thereof guide their actions. It is authoritative but requires judgment in application.”

Doctrine needs to tell people what they need to know or where they need to go to get the required support. Doctrine concerning safety clearly indicates that the Army Safety Program is a commander’s program. Safety managers across the Army have direct access to the commander’s they support. Safety is the protection of personnel and belongings or equipment and is an integral part of everything the Army does.

Explosives safety is a subset of safety but there is no one doctrinal document that covers explosives safety.

The current Army Explosives Safety Doctrine is covered in a variety of Field Manuals (FMs). FM 5-19, *Composite Risk Management*, (CRM) dated 21 August 2006, covers portions of explosives safety doctrine. This manual is a complete rewrite of FM 100-14, *Risk Management*, dated 23 April 1998. CRM is the Army’s primary decision making process for identifying hazards and controlling risks across the full spectrum of Army missions, functions, operations, and activities. Safety is one piece of CRM and so is explosives safety whenever the decision making process involves explosives.

DA PAM 385-65, although it is a policy document, also contains much needed Army Safety Program implementation guidance. Much of this guidance should be provided in a doctrine document so that commanders can identify and train to this standard. Specific, focused explosive safety doctrine is lacking. TRADOC, under its assigned responsibility to integrate safety into branch proponent doctrine, should develop doctrine to address explosive safety standards.

Summary

It is evident that a great deal of focus has been on safety policy, but the resulting explosive safety policy is lacking. Roles/responsibilities across personnel working explosives safety (safety careerists, QASAS, Ammunition LARs, and AWOs) are unclear (especially in tactical environments). Doctrine is lacking and not centralized. Explosives safety is addressed marginally in several FMs and most address explosive safety in the context of other issues. Units train to doctrine and the doctrine needs to be readily available, consistent, and easily understood.

OTHER SERVICE AND AGENCY EXPLOSIVES SAFETY CAREER PROGRAMS

LMI researched and evaluated the other military services’ explosives safety programs and training to identify best practices that could potentially be applied to the Army’s explosives safety program.

Each of the other military services’ explosives safety career programs are structured and organized to support the unique mission of each service. The Air Force organizes its safety program management around the five mission areas of ground, flight, weapons (includes explosives, nuclear, missiles), systems, and

space. The Navy and Marine Corps are organized based on their ashore and afloat missions. Explosives safety is a subset of the services' larger overall safety programs. The services have established their explosives safety standards based on DoD 6055.9-Standard (STD) minimum standards.

Military Service Comparison

Table 2 below compares the Army explosives safety program with the other services' competency certification and career field programs. You can see that the Army's program differs from the other services' programs.

Table 2. Military Service Comparison Table

	Army	Air Force	Marine Corps	Navy
Competency Certification Program				
◆ Monitoring of Certification	No	Yes	Yes	Yes
◆ Individual Monitoring of Certification	No	No	Yes	Yes
◆ Military and Civilian Programs	Civilian only	Combined	Combined	Combined
Explosive Safety Career Field				
◆ Number of Career Fields Involved	2	4	2	1 ^a
◆ Explosives Safety Career Field?	No	No	Yes	Yes
◆ Medical and Mental Certification Required?	No	No	No	Yes

^a NSPS Explosives Safety Specialist career field.

Other Military Service Mandatory Explosives Training Courses

The other military services and the Defense Contract Management Agency (DCMA) have established mandatory training requirements for specific positions or job series that are involved with A&E and they are summarized in Table 3.

Table 3. Training Summary

Service	Mandatory training	
Air Force ^a	<i>Munitions Systems Apprentice Career Development Course (CDC)—AFSC 2W031</i>	
	<i>Munitions Systems Journeyman CDC—AFSC 2W051</i>	
	<i>Combat Ammunition Planning and Production—AFCOMAC</i>	
	<i>Munitions Systems Craftsman Course—AFSC 2W071</i>	
	<i>Combat Ammunition Planning and Production—AFCOMAC</i>	
	<i>Munitions Systems Craftsman Course—AFSC 2W071</i>	
Navy ^b	<i>Basics of Naval Explosives Hazard Control—AMMO-18</i>	
	<i>Naval Explosives Safety for Supervisors/Managers—AMMO-49</i>	
	<i>Explosives Safety Officer Orientation and Refresher Course—AMMO-74</i>	
Service	Mandatory training	Refresher training
Marine Corps ^c	<i>Explosives Safety Officer Course—Sub-Course AMMO-74</i>	<i>Explosives Safety for Officers/Managers/Supervisors—AMMO-49</i>
	<i>Safety Assessment for Explosives Risk—SAFER</i>	<i>Explosives Safety Program Management—AMMO-32-1</i>
	<i>Explosives Safety for Naval Facility Planning—AMMO-36</i>	<i>Explosives Safety for Naval Facility Planning—AMMO-36</i>
	<i>Electrical Explosives Safety for Naval Facilities—AMMO-29</i>	
DCMA ^d	<i>Electrical Explosives Safety for Army Facilities—AMMO 28</i>	<i>Basics of Naval Explosives Hazard Control—AMMO 18-DL</i>
	<i>Introduction to Ammunition—AMMO 45-DL</i>	<i>Naval Laboratory Explosives Safety—AMMO 50</i>
	<i>Risk Management and Preparation of Standard Operating Procedures (SOPs) for Ammunition and Explosive Operations—AMMO 54</i>	<i>Process Safety Management and Classification</i>
		<i>Advanced Pyrotechnics Seminar</i>
	<i>Technical Ammunition—AMMO 60</i>	<i>Explosives Safety Cross Training at Military Services</i>
	<i>U.S. Army Explosives Safety—AMMO 63-DL</i>	<i>Cross Training at DCMA Offices</i>
	<i>DoD Contractor's Explosives Safety Standards—AMMO 65</i>	
	<i>U.S. Army Explosives Safety Quantity Distance and Site Planning—AMMO 82</i>	
	<i>Safety Assessment for Explosives Risk—SAFER</i>	
	<i>Chemistry of Pyrotechnics and Explosives—Only for Initial Certification</i>	

^a Mandatory training requirements for the Air Force Munitions Systems Specialty—CFETP 2W0X1.

^b Basic explosives safety training requirements for ashore ESO personnel—NAVSEA OP5 Appendix D.

^c Mandatory core training required for personnel appointed ESO/ESS—MCO P8020.10A.

^d Training required for DCMA employees to obtain an Explosives Certification—Contract Safety Certification Program Appendix E.

Summary

The Air Force, Marine Corps, and Navy have programs for ensuring their personnel are prepared to operate safely in environments where A&E is present. Each service takes a different approach and their programs have different characteristics, but their objectives are similar. They all attempt to ensure that personnel at all grade levels assigned to positions or tasks that involve A&E are prepared to

perform their duties safely and know what to do in emergency situations. They have established specific training plans and various degrees of competency monitoring processes. The Army has taken a different approach, relying on occupational health and safety generalists (CP-12) to perform tasks associated with the oversight of explosives safety. Explosives safety is only one of 24 areas of responsibility for the safety careerists. Army safety careerists receive some explosive training during the intern program; however, Army has no explosive safety certification program or requirement for additional training in this area.

WEB-BASED SURVEYS

Web-based surveys were developed and sent to CP-12 safety careerists, QASAS, and AWOs. The survey questions were designed to ascertain whether the current explosives safety training program is sufficiently preparing safety careerists to perform their explosives safety roles and responsibilities. Surveys were sent to QASAS and AWOs to get their opinion on whether CP-12 safety careerists are proficient in explosives safety.

Representatives of each career program provided the contact list of survey participants to LMI. Survey participants included intern, mid-level, and senior level safety careerists, QASAS, and AWOs. Surveys were conducted between 12 January and 19 February 2010. Survey response rates were high (765 out of 1,269 CP-12 safety careerists, 471 out of 536 QASAS, and 106 out of 193 AWOs responded).

We conducted the surveys using the Internet and a web-based survey tool. This method allows for the greatest involvement across the various participant groups and provides the ability to ensure high security, authenticating participants through encrypted user identifications, passwords, and user specific Uniform Resource Locators (URLs). Web surveying also allows us to include the entire assessable population with little financial or scheduling impact. Conducting the surveys with the full population eliminates the need to stratify samples and helps ensure returned results mirror true population distributions.

Response Rates

Our goal during administration of the survey was to obtain enough responses to provide defensible results when reaching conclusions about the broader population. We attempted to reach a minimum 50 percent response rate, which provides reasonable protection against nonresponse bias and ensures high-quality data. We exceeded this target for all three survey groups. Final response rates are provided in Table 4 below.

Table 4. Survey Response Rates

Group	Population	Returned	Response rate	Margin of error
Safety careerists	1,269	765	60%	2%
QASAS	536	471	88%	2%
AWOs	193	106	55%	6%

Margins of Error

These response rates have implications for sampling error and our confidence that results mirror the true population. During survey conduct, we strived to collect enough responses to produce results that reflect the entire population within +/- 3 percent points, at the 95 percent confidence level. Margins of error for both the safety careerists and QASAS populations exceeded this goal (see Table 4). Due to the relatively small size of the AWOs group, despite greater than 50 percent response, the overall margin of error is +/- 6 percent at the 95 percent confidence level. We took additional steps during conduct of the survey to try and drive greater response from this group, including an internal message from the organization's POC and an additional reminder to nonrespondents. The relatively low response from this group is likely due to the nature of their mission support structure and subsequent difficulty completing a web-based assessment.

Survey Results

Our analysis from the safety careerists, QASAS, and AWO surveys directly relate to improving Army explosives safety in six identified areas:

- ◆ Explosives safety knowledge
- ◆ Training
- ◆ Communication
- ◆ Support
- ◆ Future capability
- ◆ Improvement priorities.

The remaining section of the paper presents our general conclusions from the survey analysis.

Explosives Safety Knowledge

Results in the knowledge area focus on the ability of safety careerists to meet existing/potential responsibilities for explosives safety in diverse environments and structure for determining paths to proficiency.

- ◆ The majority of careerists (about 70 percent) work in an installation/facility with A&E
- ◆ About half of safety careerists have a designated role/responsibility for explosives safety

- ◆ Gaps in explosives safety knowledge compared to other areas of responsibility (70 percent report knowledge lower in explosives safety)
 - Knowledge in explosives safety is higher for safety careerists with responsibility for explosives safety, who work in facilities that consider explosives safety a top priority, or who work explosives issues on a more frequent basis
- ◆ Safety careerists have a strong desire for increased training/capability in explosives safety areas
- ◆ Need increased knowledge to meet explosives safety program requirements—especially in deployed environments
 - About 40 percent report existing level of knowledge on explosives safety below requirements
 - Careerists with responsibility for explosives safety, who work in facilities that consider explosives safety a top priority, or who are at GS level 12–13 are more likely to have levels of knowledge above or equal to explosives safety program requirements
- ◆ Gaps in knowledge exist across all explosives safety task areas (see Table 5 for detail on average gaps in knowledge necessary to support requirements across skill areas)
- ◆ About three in ten facilities currently participate in some type of explosives operator certification
- ◆ Standards for explosives safety operator certification vary widely across facilities from Army level (ACOM/AMC/FORSCOM/Installation Management Command [IMCOM]) to locally developed training requirements

*Table 5. Safety Careerists Knowledge Gap Index
(Based on % Below Requirements)*

Explosives safety skill areas	Safety careerists ^a	QASAS	AWOs	Weighted average ^b	Rank
Reviewing/approving explosives safety deviations	37%	38%	38%	38%	1
Reviewing/approving lighting protection designs	37%	38%	32%	36%	2
Reviewing/approving explosives safety licenses	36%	31%	40%	36%	3
Coordinating explosives safety training/education	32%	40%	38%	35%	4
Applying quantity distances to facilities/operations	33%	39%	35%	35%	5
Reviewing facility designs for proper safety controls	36%	32%	36%	35%	6
Administering explosives safety programs	33%	34%	37%	34%	7
Investigating/reporting on explosives safety mishaps	34%	36%	34%	34%	8
Reviewing/approving explosives safety site plans	34%	34%	33%	34%	9
Evaluating explosives safety program effectiveness	29%	37%	35%	32%	10
Conducting inspections to identify hazards/correction	27%	32%	36%	30%	11
Reviewing/approving Standing Operating Procedures	28%	20%	30%	27%	12
Providing guidance on explosives safety issues	22%	29%	30%	26%	13

^a Includes only responses from safety careerists working at installations/facilities with ammunition/explosives.

^b Weighted average gives value of careerists' responses twice the importance of other groups.

Training

Conclusions in the training area directly relate to existing coverage of training offered and barriers to participation.

- ◆ Incomplete coverage of explosives safety training across the CP-12 career field even at the core level (about 25 percent have not received any training on explosives safety)
- ◆ Most receive less than four hours of training on explosives safety annually
- ◆ Need additional training to support explosives safety responsibilities (about half report they need more initial and refresher training to perform explosives safety job functions)
- ◆ Personnel currently in explosives safety roles find it difficult to stay current on training
- ◆ The need for additional training is high across all explosives safety skill areas (see Table 6 below for ranking of training needs across topic areas)
 - Explosives risk assessment processes and principles was the number one ranked area for priority of additional training (more than 75 percent responded that additional training in this area is a high priority)

- Safety careerists are trained in reviewing and validating risk assessments, but write-in detail suggests a lack of explosives-specific knowledge impacts their ability to be effective
- ◆ Overall, careerists rate existing training on explosives about average for quality (careerists with designated roles/responsibility for explosives safety are more satisfied with the quality of training than those with no responsibility in this area)
- ◆ About half report high retention of information from previous training on explosives safety
 - Retention of information is significantly greater for careerists with responsibility for explosives safety or who work in facilities that consider explosives safety a top priority. Years and level experience also positively correlate to retention of explosives safety information.
- ◆ Safety careerists prefer classroom instruction over other training modes (66 percent prefer classroom or a combination of classroom and web over other modes)

*Table 6. Safety Careerists Training Needs Priority Ranking
(Percent Responded Essential/High Priority)*

Explosives safety skill areas	Safety careerists ^a	QASAS	AWOs	Weighted average ^b	Rank
Explosives safety risk assessment process/principles	76%	87%	85%	81%	1
Safety inspection/reporting capabilities	75%	82%	80%	78%	2
General refresher in explosives safety	70%	81%	84%	76%	3
Incident investigation/hazard control planning	73%	79%	76%	75%	4
Ammunition quantity distance standards	69%	82%	80%	75%	5
Explosives safety site plan requirements	67%	84%	81%	75%	6
Explosives safety program management	67%	82%	81%	74%	7
Explosives principles and effects	62%	74%	74%	68%	8
Radiation safety standards	59%	62%	53%	58%	9

^a Includes only responses from safety careerists working at installations/facilities with ammunition/explosives.

^b Weighted average gives value of careerists' responses twice the importance of other groups.

Communication

Results linked to communication center on availability and access to information, and clarity of information on roles and responsibilities for explosives safety across personnel groups and structure for support at all levels.

- ◆ Stakeholder groups need additional communication/clarity on roles and responsibilities

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- ◆ Paths to support on explosives safety issues/questions are unclear for both safety personnel and operational staff
 - ◆ Careerists are unclear of sources for support and training on explosives safety, especially during deployment
 - ◆ Careerists are unclear on funding structure and availability of training:
 - Funding structure and availability of training are top barriers to participation in explosives safety

Support

Conclusions in the support area address current structure for meeting explosives safety requirements at the mission level.

- ◆ Level of collaboration is generally low across A&E career fields (safety careerists, QASAS, and AWOs)
 - Less than 40 percent of A&E professionals collaborate with others on explosives safety more than once a year
 - Safety careerists seek increased opportunity for collaboration/cross training with other A&E professionals

Future Capabilities

Conclusions in the future capability area highlight structural conditions that may impact the ability of Army safety to support mid/far-term explosives safety operations.

- ◆ Existing workforce is at the short end of their career path (75 percent of respondents have 20 years or more of service)
- ◆ Interest in specialization in explosives safety is low under the current structure (only 30 percent are likely to apply for a promotional opportunity in explosives safety)
 - Careerists with responsibility for explosives safety or who work in facilities that consider explosives safety a high priority are more likely to apply for promotional opportunities in explosives safety
 - However, we found no statistical/practical difference on interest in specialization associated with years of experience—interest is universally low, even for younger careerists

Improvement Priorities

This section provides stakeholder views regarding areas most in need of improvement to support increased proficiency of careerists in explosives safety.

- ◆ Improved coverage of training topics and structure are the top priority for safety careerists—especially core explosives safety and refresher training
- ◆ Safety careerists desire more specialized training, including A&E storage and transportation, Area of Responsibility (AOR) support, industrial operations, and joint service training opportunities
- ◆ Specialized explosives safety training programs should be developed to meet unique operational functions, including munitions and chemical production and storage and handling of foreign materiel
- ◆ Seek improved access to funding and structure for reimbursement of training related costs
- ◆ Safety careerists desire improved communication across a number of areas, including process/opportunities for improving capabilities in explosives safety, clarity of roles/responsibilities, and sources of information for technological and mission support

These results from our quantitative and qualitative assessments of stakeholder groups provide a baseline for understanding the existing capabilities of safety careerists to support the Army's explosives safety objectives. On all counts, we found participants forthcoming about existing gaps in competency and structural improvements necessary to ensure the Army safety program is on the cutting edge as a benchmark for others.

COMMANDER INPUT

To enrich and validate the quantitative data, we conducted phone interviews with FORSCOM and JMC installation commanders to get their opinions on the existing explosives safety competency of CP-12 safety careerists. We compiled contact lists of commanders with the support of members of the working group. The goal was to target FORSCOM commanders who were recently deployed and in the reset cycle of Army Force Generation (ARFORGEN) and JMC commanders to offer a perspective from ammunition production and handling operations. We conducted structured interviews via conference calls 25 March through 27 April 2010. Interviews with commanders provided a leadership perspective on the existing capability of safety personnel to support operational requirements for explosives safety.

Interview Structure

We developed a general interview structure to ensure questions aligned with our quantitative assessments and to provide uniformity across command groups. Members of the working group supported development of interview topics and approved the final interview guide. To align this effort with typically heavy demands on commanders' schedules, we limited topics to ensure interviews could be completed in as little as 15 minutes. During the interviews, we found commanders very interested in the study goals and more than willing to spend additional time to elaborate on their views.

Our interview topics included:

- ◆ Existing personnel structure for supporting explosives safety and alignment to regulations and units' Mission Essential Task List (METL)
- ◆ Level of knowledge necessary for safety careerists to support commanders with explosives safety issues
- ◆ Availability and adequacy of information/guidance for risk management including determining acceptable levels of risk in the area of explosives safety
- ◆ Gaps/shortfalls to ensuring safety of explosives and actions necessary to close gaps.

GAP ANALYSIS

LMI performed a gap analysis based on the results of the survey, commander interviews, policy and doctrine review, and assessment of the other military services' explosives safety programs.

We used the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF and Policy) capability development framework, and the process of cross walking gaps to DOTMLPF and Policy, in support of the gap analysis. DOTMLPF and Policy provides a common DoD and service methodology/framework for developing solutions to capability gaps. This framework underpins the DoD's Joint Capabilities Integration and Development System (JCIDS) and Capabilities Based Assessments (CBAs). Both JCIDS and CBA methodologies influenced the gap analysis. Although LMI's primary focus was on training, the solution sets for identified gaps involve many combinations of doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy initiatives.

SUMMARY

It is envisioned that the final report will be a group effort between LMI and the Army Explosives Safety Technical Competency Working Group. The subject matter experts will review the draft findings and recommendations to ensure they are accurate and feasible. The resulting recommendations, when adopted and implemented, will improve the ability of safety careerists to support the Army's explosives safety program. The recommendations will also go a long way to strengthen explosive safety policy and doctrine so that the entire safety community will fully understand explosives safety roles, missions, and tools available. The full results of this analysis and our recommendations for improving the Army's ability to meet their explosives safety mission is under review by the stakeholder group with an expected publication date of 31 July 2010.

Explosives Safety Competency Study

DDESB Seminar

July 13, 2010



LMI

Agenda

- Overview
- Army policy and doctrine
- Other service programs
- Stakeholder surveys
- Way forward

Overview: The Issue

The Army has an exceptional track record and high quality explosives safety program to protect its soldiers, civilians, contractors, the public, and the environment; but recognizes it is essential to continually seek opportunities for improving explosives safety across the enterprise.

The Issue: Several Army and DDESB forums have questioned the adequacy of training/experience in explosives safety

- Army safety careerists have broad responsibilities and are charged with managing *all* safety programs—including explosives safety

Action Taken: Director of Army Safety/USATCES sponsored LMI to assess explosives safety competencies and training to identify gaps and recommend improvements

Overview: Study Approach

- 1) Identify, evaluate, and benchmark Army explosives safety competencies
 - Identify and assess explosives safety policies
 - Benchmark other services' explosives safety training and programs
 - Survey Army stakeholders
- 2) Crosswalk explosives safety capabilities to identify gaps/ issues impacting safety careerists' explosives safety competencies
 - Apply JCIDS/DOTMLPF methodology*
 - Focus on doctrine, policy, and training
- 3) Provide recommendations, priorities, and strategies to address identified gaps and achieve required levels of core competencies

* Not a full JCIDS process

Overview: Key Players

- Army Explosives Safety Competencies Working Group is overseeing the assessment. Members include:
 - Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health (DASA ESOH)
 - Director of Army Safety
 - Headquarters Department of Army (G4–Logistics)
 - U.S. Army National Guard Bureau (NGB)
 - Army Material Command (AMC)
 - U.S. Army Installation Management Command (IMCOM)
 - U.S. Army Forces Command (FORSCOM)
 - U.S. Army Training and Doctrine Command (TRADOC)
 - U.S. Army Joint Munitions Command (JMC)
 - U.S. Army Combat Readiness/Safety Center (USACR/Safety Center)
 - DAC USATCES

Overview: Army Structure

- Four types of Army personnel have direct responsibility for supporting the Army's explosives safety program
 - Civilian Occupational Safety and Health professionals (CP-12 safety careerists)
 - Civilian Quality Assurance Specialists (Ammunition Surveillance) (QASAS)
 - Civilian Ammunition Logistics Assistance Representatives (LARS)
 - Ammunition Warrant Officers (AWOs)
- Focus of assessment is explosives safety competency
 - Careerists tasked with planning, directing, and evaluating all safety and occupational health efforts within the commands they serve
 - Explosives safety is one of 24 areas of responsibility for careerists

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Army Policy and Doctrine

Reviewed Army explosives safety policies and doctrine to identify gaps, shortfalls, and overlaps in explosives safety guidance, roles and responsibilities, training, and other areas that could adversely impact explosive safety competency

- AR 385-10 is the primary policy document establishing *The Army Safety Program* and explosives safety policy
 - Explosives safety also minimally addressed in other Army policy publications
- No specific, focused explosive safety doctrine
 - Doctrine is not centralized (addressed marginally in a variety of Field Manuals)

225 explosive safety related issuances identified

Other Service Programs

Researched other military services' explosives safety programs and training to identify best practices

- Other services have structured explosives safety career programs to support their unique missions
- The Army approach differs; relying on occupational health and safety professionals (CP-12) to perform tasks associated with oversight of explosives safety

	Army	Air Force	Marine Corps	Navy
Competency Certification Program				
◆ Monitoring of Certification	No	Yes	Yes	Yes
◆ Individual Monitoring of Certification	No	No	Yes	Yes
◆ Military and Civilian Programs	Civilian only	Combined	Combined	Combined
Explosive Safety Career Field				
◆ Number of Career Fields Involved	2	4	2	1 ^a
◆ Explosives Safety Career Field?	No	No	Yes	Yes
◆ Medical and Mental Certification Required?	No	No	No	Yes

^a NSPS Explosives Safety Specialist career field.

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Stakeholder Surveys: Methodology

We conducted web-based surveys with CP-12 safety careerists, QASAS, and Ammunition Warrant Officers (AWOs) to find out whether the current explosives safety training program is sufficiently preparing safety careerists to perform their explosives safety roles and responsibilities

- Collaborated with Army explosives safety stakeholders to develop separate surveys for each group
- Surveys fielded 12 Jan–19 Feb 2010
 - Ensured distribution and response represented full population of target groups
- Analyzed data (frequencies, percent distributions, bivariate analysis of background factors) to identify gaps/shortfalls

Stakeholder Surveys: Response Rates

- High quality survey data achieved
 - Combined response rate greater than 67% (more than 1,300 responses)
 - Low margins of error for CP-12 safety careerists and QASAS results
 - Margins of error for these groups less than +/- 2% (at 95% confidence interval)
 - Ammunition WO results at +/- 6%
 - Level of confidence that results reflect population

Group	Population	Returned	Response rate	Margin of error
Safety careerists	1,269	765	60%	2%
QASAS	536	471	88%	2%
AWOs	193	106	55%	6%

Stakeholder Surveys: Knowledge Gaps

- Knowledge in explosives safety is low compared to other areas of responsibility
 - 65 percent of those working in an ammunition and explosives (A&E) environment report proficiency lower in explosives safety; gap decreases to 49 percent if they have a designated role in explosives safety
- More knowledge is needed to meet explosives safety program requirements
 - Below requirements for 37 percent of those working in an A&E environment and for 28 percent of those with a designated role in ES
 - Gaps in knowledge exist across all explosives safety task areas
- More training needed to fill gaps
 - About half report they need additional training to stay current on the full range of explosives safety tasks (risk assessment, inspection, accident investigation, site planning, explosives principles/effects, etc.)

Stakeholder Surveys: Communication

- Personnel working in explosives safety (safety careerists, QASAS, AWOs) are not always clear on each others' roles and responsibilities
- Paths to support on explosives safety issues/questions are unclear for both safety personnel and operational staff
- Unsure of sources for support and training on explosives safety
- Uncertain about funding structure and availability of training
 - Funding structure and availability of training are top barriers to participation in explosives safety training

Stakeholder Surveys: Improvement Priorities

- Improved coverage of training topics and structure are a top priority for safety careerists—especially core explosives safety and refresher training
 - Expanded coverage of explosives safety management “awareness” training at the command/leadership level is also important
- Need more specialized training, including A&E storage and transportation, Area of Responsibility (AOR) support, industrial operations, and joint service training opportunities
- Seek improved access to funding and structure for reimbursement of training related costs
- Desire improved communication across a number of areas including
 - Process/opportunities for improving capabilities in explosives safety
 - Clarity of roles/responsibilities
 - Sources of information for technological and mission support

Agenda

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Way Forward

- Performed gap analysis based on the results of the surveys, policy and doctrine review, and assessment of the other military services' explosives safety programs
 - Using the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF and Policy) capability development framework
- Identifying competencies required to ensure explosives safety mission requirements are met or exceeded
 - Developing specialized explosives safety training to meet requirements across career levels
- Final report of study findings and recommendations (31 July 2010)
 - Report is a joint LMI and Army Explosives Safety Technical Competency Working Group product

Goal: a set of actionable recommendations that, when implemented, will improve explosives safety competencies of Army personnel in entry, intermediate, and advanced positions

Questions?

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